

Product Information Sheet

Panasonic Batteries

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Product: Manganese Dioxide (CR Type) Lithium Batteries
Applicable models/sizes: All CR type cylindrical and coin batteries

Revision: J, January 2009

MSDS

Material Safety Data Sheets (MSDS) are a sub-requirement of the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard, 29 CFR Subpart 1910.1200. This Hazard Communication Standard does not apply to various subcategories including anything defined by OSHA as an "article". OSHA has defined "article" as a manufactured item other than a fluid or particle; (i) which is formed to a specific shape or design during manufacture; (ii) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and (iii) which under normal conditions of use does not release more than very small quantities, e.g. minute or trace amounts of a hazardous chemical, and does not pose a physical hazard or health risk to employees.

Because all of our batteries are defined as "articles", they are exempt from the requirements of the Hazard Communication Standard; hence a MSDS is not required.

The following components are found in a Panasonic Manganese Dioxide (CR) Lithium battery:

Cylindrical Cell Components	Material	Formula	CAS #
Positive Electrode	Manganese Dioxide	MnO ₂	1313-13-9
Negative Electrode	Lithium	Li	7439-93-2
Electrolyte	Propylene Carbonate-Solvent	C ₄ H ₆ O ₃	108-32-7
	1,2 Dimethoxyethane-Solvent	C ₄ H ₁₀ O ₂	110-71-4
	Lithium Triflate-Salt	CF ₃ SO ₃ Li	33454-82-9
Coin Cell Components	Material	Formula	
Positive Electrode	Manganese Dioxide	MnO ₂	1313-13-9
Negative Electrode	Lithium	Li	7439-93-2

The batteries referenced herein are exempt articles and are not subject to the OSHA Hazard Communication Standard requirement. This sheet is provided as a service to our customers.

Electrolyte	Propylene Carbonate-Solvent	C ₄ H ₆ O ₃	108-32-7
	1,2 Dimethoxyethane-Solvent	C ₄ H ₁₀ O ₂	110-71-4
	Lithium Perchlorate-Salt	LiClO ₄	7791-03-9

Lithium Triflate is Lithium Trifluoromethanesulfonate.

DISPOSAL

Lithium batteries are neither specifically listed nor exempted from the Federal Environmental Protection Agency (EPA) hazardous waste regulations as promulgated by the Resource Conservation and Recovery Act (RCRA). The only metal of possible concern in a lithium battery is lithium that is not a listed or characteristic toxic hazardous waste. Waste lithium batteries can be considered a reactive hazardous waste if there is a significant amount of unreacted, or unconsumed lithium remaining in the spent battery. The key to disposing of a lithium battery as a non-hazardous waste is to guarantee that it is fully or mostly discharged. Once it is discharged it can be disposed of as non-hazardous waste. You can dispose of a fully charged or partially discharged lithium battery as a hazardous waste after they are first neutralized through an approved secondary treatment. The need for a secondary treatment prior to disposal is a requirement of the U.S. Land Ban Restrictions of the Hazardous and Solid Waste Amendments of 1984. A secondary treatment center can only receive these batteries as manifested hazardous waste. The waste code for charged lithium

Notice: The information and recommendations set forth are made in good faith and are believed to be accurate at the date of preparation. Panasonic Industrial Company makes no warranty expressed or implied.

batteries is D003, reactive. **In either case, button cell batteries contain so little lithium that they never qualify as a reactive hazardous waste. These batteries are safe for disposal in the normal municipal waste stream.**

Disposal of large quantities of undischarged lithium batteries should be performed by permitted, professional disposal firms knowledgeable in Federal, State and local hazardous materials and hazardous waste transportation and disposal requirements. As always, households are exempt from the RCRA hazardous waste guidelines.

In California, packages that contain CR lithium coin cells and the Owners/Operating Instructions of products that contain CR lithium coin cells must include the following statement: "Perchlorate Material – special handling may apply, See www.dtsc.ca.gov/hazardouswaste/perchlorate". The effective date for this Perchlorate label was July 1, 2006 for non-consumer products and January 1, 2007 for consumer products.

TRANSPORTATION

Effective October 1, 2008 all Panasonic lithium batteries are not subject to the requirements of the Department of Transportation (DOT) Subchapter C, Hazardous Materials Regulations if shipped in compliance with 49 CFR 173.185 and Special Provision 188.

Effective January 1, 2009 all Panasonic lithium batteries can be shipped by air in accordance with International Civil Aviation Organization (ICAO), Section II or International Air Transport Association (IATA), Part 1 Packing Instructions (PI) 968 (Batteries), PI 969 (Batteries, packed with equipment) and PI 970 (Batteries, contained in equipment) as appropriate

Currently all Panasonic lithium batteries are regulated by the International Maritime Organization (IMO) under Special Provisions 188 and 230. These regulations will stay in effect until January 1, 2010 when Special Provisions 188 and 230 will be updated

If you build any of our lithium cells into a battery pack, you must also assure that they are tested in accordance with the UN Model Regulations, Manual of Test and Criteria. Part III, subsection 38.3.

Effective December 29, 2004, the DOT requires that the outside of each package that contains primary lithium batteries, regardless of size or number of batteries, be labeled with the following statement: "**PRIMARY LITHIUM BATTERIES- FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT**". The labeling requirement covers shipments via highway, rail, vessel or cargo-only aircraft and covers all shipments inside, into or out of the US. The label must be in contrasting color and the letters must be 12 mm (0.5 in) in height for packages weighing more than 30 Kg and 6 mm (0.25 in) in height for packages weighting less than 30 Kg.

If you plan on transporting any untested prototype battery packs contact your Panasonic Sales Representative for regulatory information.

First Aid

If you get electrolyte in your eyes, flush with water for 15 minutes without rubbing and immediately contact a physician. If you get electrolyte on your skin wash the area immediately with soap and water. If irritation continues, contact a physician. If a battery is ingested, call the National Capital Poison Center (NCPC) at 202-625-333 (Collect) or your local poison center immediately

General Recommendations

CAUTION: Risk of fire, explosion and burns. Do not recharge, crush, heat above 212°F (100°C) or incinerate.

Fire Safety

In case of fire, you can use a Class "D" fire extinguisher or other smothering agent such as Lith-X, copper powder or dry sand. If you use water, use enough to smother the fire. Using an insufficient amount of water will only make the fire worse. Cooling the exterior of the batteries will help prevent rupturing. Burning of these batteries will generate toxic and corrosive lithium hydroxide fumes. Fire fighters should use self-contained breathing apparatus.

PRODUCT SAFETY DATA SHEET

IDENTITY Product Category : Manganese Dioxide Lithium Battery
 Model Name : CR2032
 Nominal Voltage : 3 V
 Nominal Capacity : 220mAh
 Chemical System : Manganese Dioxide / Lithium
 Design for Recharge : Yes. No.

SECTION I MANUFACTURER'S INFORMATION

Manufacturer's Name : Sony Energytec Inc.
Supplier's Name : Sony Corporation Recording Media & Energy Company
Supplier's Address : 1-11-1 Oosaki Shinagawa-ku Tokyo 141-0032 Japan
Information Telephone : Japan +81-3-5435-3294 (Sony Corp. RME Co.)
Emergency Telephone : Japan +81-24-958-3811 (Sony Energytec Inc.)
Date Prepared : February 5, 1999
Signature of Paper : *H. Hashimoto*

SECTION II MATERIAL AND INGREDIENTS INFORMATION

Important Note : The battery should not be opened or burned since the following ingredients contained within, or their discharge or combustion products, could be harmful under some circumstance if exposed.

Material or Ingredients

Cathode : Manganese Dioxide (CAS# 1813-13-9)
 Graphite (CAS# 7782-42-5)

Anode : Metallic Lithium (0.062g) (CAS# 7439-93-2)

Electrolyte : Dimethoxyethane (CAS# 110-71-4)
 Propylene Carbonate
 Lithium Perchlorate

Others : Heavy Metals such as Mercury, Cadmium and Lead are not added in the battery.

SECTION III FIRE AND EXPLOSION HAZARD DATA

In case of fire, it is permissible to use any class of extinguishing medium on these batteries or their packing material.

Cool exterior of batteries if exposed to fire to prevent rupture.






Material/Product Safety Data Sheet (MSDS-PSDS)

LM products	Lithium Manganese dioxide single cells and multi-cell battery packs
Revision 6 Date 02/2009	

1. Identification of the Substance or Preparation and Company			
Product	Lithium Manganese Dioxide single cells and multi-cell battery packs (Li-MnO₂)		
Production sites	Saft Ltd. River Drive Tyne & Wear South Shields NE33 2TR – UK Ph. :+44 191 456 1451 Fax :+44 191 456 6383	Saft Rue Georges Leclanché BP 1039 86060 Poitiers cedex 9 FRANCE Ph. :+33 (0)5 49 55 48 48 Fax :+33 (0)5 49 55 48 50	Saft America Inc 313 Crescent Street Valdese NC 28690 – USA Ph. :+1 (828) 874 4111 Fax :+1 (828) 874 2431
www.saftbatteries.com (section "Contact")			
Emergency contact	+1 (703) 527 3887 (CHEMTREC US Service Center) within the USA : 800 424 9300		

2. Hazards Identification
<p>Do not short circuit, recharge, puncture, incinerate, crush, immerse, force discharge or expose to temperatures above the declared operating temperature range of the product. Risk of fire or explosion. The Lithium-Manganese dioxide batteries described in this Product Safety Data Sheet are sealed units which are not hazardous when used according to the recommendations of the manufacturer.</p> <p>Under normal conditions of use, the electrode materials and electrolyte they contain are not exposed to the outside, provided the battery integrity is maintained and seals remain intact. Risk of exposure only in case of abuse (mechanical, thermal, electrical) which leads to the activation of safety valves and/or the rupture of the battery containers. Electrolyte leakage or battery vent/explosion/fire may follow, depending upon the circumstances.</p>

3. Composition & Information on Ingredients					
Each cell consists of a hermetically sealed metallic container containing a number of chemicals and materials of construction of which the following could potentially be hazardous upon release.					
Ingredient	Content	CAS No.	CHIP Classification		
Lithium (Li)	3.2%	7439-93-2			F; R14/15 C; R34 R14/15, R34 S(1/2), S8, S43, S45
Manganese dioxide (MnO ₂)	40.5%	1313-13-9			R20, R22 S25



Lithium perchlorate (LiClO ₄)	< 2.00%	7791-03-9			R8, R36/37/38 S17, S26/27, S36/37/38
Tetrahydrofurane (C ₄ H ₈ O)	7.6%	109-99-9			F; R11, R19 Xi; R36/37 R11, R19, R36/37 S2, S16, S29, S33
Propylene Carbonate (C ₃ H ₆ CO ₃)	9.0%	108-32-7			R36
1,2 Dimethoxyethane (CH ₃ OCH ₂ CH ₂ OCH ₃)	2.4%	110-71-4			R11, R19/20 S24/25
Carbon (C _n)	2.2%	1333-86-4			NONE KNOWN
<i>Amount vary depending on cell size</i>					





4. First Aid Measures	
Inhalation	Remove from exposure, rest and keep warm. In severe cases obtain medical attention.
Skin contact	Wash off skin thoroughly with tap water. Remove contaminated clothing and wash before reuse. In severe cases obtain medical attention.
Eye contact	Irrigate thoroughly with water for at least 15 minutes. Obtain medical attention.
Ingestion	Wash out mouth thoroughly with water and give plenty of water to drink. Obtain medical attention.
Further treatment	All cases of eye contamination, persistent skin irritation and casualties who have swallowed this substance or been affected by breathing its vapours should be seen by a Doctor.

5. Fire Fighting Measures	
<p>CO₂ extinguishers or, even preferably, copious quantities of water or water-based foam can be used to cool down burning Li-MnO₂ cells and batteries, as long as the extent of the fire has not progressed to the point that the lithium metal they contain is exposed (marked by deep red flames).</p> <p>Do not use for this purpose sand, dry powder or soda ash, graphite powder or fire blankets.</p> <p>Use only metal (Class D) extinguishers on raw lithium.</p>	
Extinguishing Media	Use water or CO ₂ on burning Li-MnO ₂ cells or batteries and class D fire extinguishing agent only on raw lithium

6. Accidental Release Measures	
<p>Do not breathe vapours or touch liquid with bare hands.</p> <p>If the skin has come into contact with the electrolyte it should be washed thoroughly with water.</p> <p>Earth or sand should be used to absorb the exudation, seal leaking battery and earth in a heavy duty polythene bag and dispose of as Special Waste in accordance with local regulations.</p>	



7. Handling and Storage	
Handling	Do not short circuit or expose to temperatures above the temperature rating of battery. Do not recharge, over-discharge, force discharge, immerse, puncture or crush.
Storage	Store in a cool place but prevent condensation on cells and batteries. Elevated temperatures can result in shortened battery life and degrade performance. Do not store batteries in high humidity environments for long periods of times.
Other	Lithium-Manganese dioxide batteries are not rechargeable and should not be tentatively charged. Follow Manufacturers recommendations regarding maximum recommended currents and operating temperature range. Applying pressure on deforming the battery may lead to disassembly.

8. Exposure Controls & Personal Protection				
Occupational exposure standard	Compound	8hr TWA	15min TWA	SK
	Tetrahydrofurane	50 ppm	100 ppm	
	1,2 Dimethoxyethane	5 ppm	-	**
	Respiratory protection	In all fire situations, use self-contained breathing apparatus.		
	Hand protection	In the event of leakage wear gloves.		
	Eye protection	Safety glasses are recommended during handling		
	Other	In the event of leakage, wear chemical apron.		
** Can be absorbed through broken skin				

9. Physical and Chemical Properties	
Appearance	Cylindrical shape
Odour	If leaking, smells of medical ether.
pH	Not applicable as supplied
Flash Point	Not applicable unless individual components exposed
Flammability	Not applicable unless individual components exposed
Relative density	Not applicable unless individual components exposed
Solubility (water)	Not applicable unless individual components exposed
Solubility (other)	Not applicable unless individual components exposed



10. Stability and Reactivity	
Product is stable under conditions described in Section 7.	
Conditions to avoid	Heat above 70°C or incinerate. Deform. Mutilate. Crush. Pierce. Disassemble. Recharge. Short circuit. Expose over a long period to humid conditions.
Materials to avoid	Oxidising agents, alkalis, water.
Hazardous reactions	Lithium metal reacts with water to produce highly flammable gasses.
Hazardous decomposition reactions	Toxic Fumes, and may form peroxides

11. Toxicological Information	
Signs & symptoms	None, unless battery ruptures. In the event of exposure to internal contents, vapour fumes may be very irritating to the eyes and skin.
Inhalation	Lung irritant.
Skin contact	Skin irritant
Eye contact	Eye irritant.
Ingestion	Poisoning if swallowed.
Medical conditions aggravated by exposure	In the event of exposure to internal contents, moderate to severe irritation, burning and dryness of the skin may occur. Target organs nerves, liver and kidneys.

12. Ecological Information	
Mammalian effects	None known at present.
Eco-toxicity	None known at present.
Bioaccumulation potential	Slowly Bio-degradable.
Environmental fate	None known environmental hazards at present.

13. Disposal Considerations	
Do not incinerate, or subject cells to temperature in excess of 70°C. Such abuse can result in loss of seal, leakage, and/or cell explosion. Dispose of in accordance with appropriate local regulations.	

14. Transport Information	
Note : when manufacturing a new battery pack, one must assure that it is tested in accordance with the UN Model Regulations, Manual of Tests and Criteria, Part III, subsection 38.3	
Label for conveyance	For the single cell batteries and multicell battery packs which are non-restricted to transport, use lithium batteries inside label. For the single cell batteries and multicell battery packs which are restricted to transport (assigned to the Miscellaneous Class 9), use Class 9 Miscellaneous Dangerous Goods and UN Identification Number labels. In all cases, refer to the product transport certificate issued by the Manufacturer.
UN Number	UN 3090 (cells and batteries shipped in bulk) UN 3091 (cells and batteries shipped in or with equipment)
Shipping name	Lithium Metal Batteries
Hazard classification	Depending on their lithium metal content, some single cells and small multicell battery packs may be non-assigned to Class 9 (Refer to Transport Certificate)
Packing group	II



IMDG Code	3090 (Lithium batteries) 3091 (Lithium batteries in or with equipment)
CAS	
EmS No.	F-A, S-I
Marine pollutant	No
ADR class	Class 9

15. Regulatory Information

Regulations specifically applicable to the product:

- ACGIH and OSHA: see exposure limits of the internal ingredients of the battery in section 8.
- IATA/ICAO (air transportation): UN 3090 or UN 3091
- IMDG (sea transportation) : UN 3090 or UN 3091
- Transportation within the US-DOT, 49 Code of Federal Regulations

Risk phrases	Lithium	R14/15 R34	Reacts violently with water, liberating extremely flammable gases. Causes burns.
	Manganese Dioxide	R20/22	Harmful by inhalation and if swallowed.
	Lithium Perchlorate	R8 R36/37/38	Contact with combustible material may cause fire. Irritating to eyes, respiratory system and skin.
	Tetrahydrofuran	R11 R19 R36/37	Highly Flammable May form explosive peroxides. Irritating to eyes and respiratory system.
	Propylene Carbonate	R36	Irritating to the eyes.
	1,2 Dimethoxyethane	R11 R19 R20	Highly Flammable May form explosive peroxides Harmful by inhalation
Safety phrases	Lithium	S1/2 S8 S43 S45	Keep locked up and out of reach of children. Keep container dry In case of fire, use Lith-X (Graphite based) fire extinguisher. Never use water. In case of accident or if you feel unwell, seek medical advice immediately.
	Manganese Dioxide	S25	Avoid contact with eyes.
	Lithium Perchlorate	S17 S26 S27 S36/37	Keep away from combustible material. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Take off immediately all contaminated clothing. Wear suitable protective clothing and gloves. In case of insufficient ventilation, wear suitable respiratory equipment.
	Tetrahydrofuran	S38 S2 S16 S29 S33	Keep out of the reach of children. Keep away from sources of ignition - No Smoking. Do not empty into drains. Take precautionary measures against static discharges.
	Propylene Carbonate	S24/25	Avoid contact with skin and eyes.
	1,2 Dimethoxyethane	S24/25	Avoid contact with skin and eyes.
UK regulatory references	Classified under CHIP		



16. Other Information

This information has been compiled from sources considered to be dependable and is, to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, no representation, warranty (either expressed or implied) or guarantee is made to the accuracy, reliability, or completeness of the information contained herein.

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Signature _____


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